Prevalence of seedborne symbionts in grass populations: connecting host fitness, endophyte transmission and intergenerational effects

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Asexual *Epichloë* fungal endophytes (Clavicipitaceae) are transmitted vertically from mother plants to seeds. These endophytes enhance plant fitness primarily by conferring resistance to herbivores and promoting growth under competitive and stressful conditions. However, variation in symbiosis prevalence among populations likely arises from differences in symbiosis outcome (i.e. relative fitness of symbiotic vs. non-symbiotic plants), and vertical transmission efficiency. Like any other symbiotic interaction, the outcome of plant-*Epichloë* symbiosis is context-dependent, yet how vertical transmission efficiency aligns with this variability remains unclear. Symbiosis prevalence is generally higher in sites with greater ecosystem productivity, and vertical transmission efficiency is often positively correlated with host fitness. However, exceptions suggest that certain stressors or genetic factors involved in plant-*Epichloë* compatibility may decouple vertical transmission efficiency from plant fitness. Recent evidence indicates that intergenerational effects induced by environmental factors may reinforce endophyte-mediated benefits, improving plant response to the same stressor (e.g., herbivory or drought). Conversely, other factors that disrupt the symbiosis may have the opposite effects. By linking individual processes to population-level dynamics, we can gain a deeper understanding of the mechanisms driving variation in plant-*Epichloë* symbiosis prevalence.

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